DOCUMENT RESUME

ED 205 917 CS 006 216

AUTHOR Tierney, Robert J.; Pearson, P. David
TITLE Learning to Learn from Text: A Framework for Improving Classroom Practice. Reading Education Report No. 30.
INSTITUTION Bolt, Beranek and Newman, Inc., Cambridge, Mass.; Illinois Univ., Urbana. Center for the Study of Reading.
SPONS AGENCY National Inst. of Education (ED), Washington, D.C.
PUB DATE Aug 81
CONTRACT 400-76-0116
NOTE 38p.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Cognitive Processes; Curriculum Development; Learning Theories; *Reading Comprehension; Reading Improvement; *Reading Instruction; *Reading Processes; Teaching Methods
IDENTIFIERS Schemata; *Schema Theory

ABSTRACT

A reader's background knowledge (schemata) and purpose for reading have an overriding influence upon the reader's development of meaning. Reading comprehension also involves activating, focusing, maintaining, and refining ideas toward developing interpretations that are plausible, cohesive, and complete. Recent examinations of instructional practices suggest that there are not many worthwhile teaching practices for developing or improving comprehension. If teachers can better understand the nature of reading comprehension and learning, they will have a basis for determining what might facilitate the development of comprehension. From the schema theory perspective, the following considerations can serve as guidelines to implement reading comprehension curriculum changes which determine whether the reader (1) has relevant schemata for understanding a text, (2) engages the appropriate schemata during reading, (3) exhibits flexible processing across different texts read for different purposes, (4) understands the text adequately, and (5) recognizes how to transfer this knowledge to other reading situations. (HTH)

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CENTER FOR THE STUDY OF READING

Reading Education Report No. 30

LEARNING TO LEARN FROM TEXT: A FRAMEWORK FOR IMPROVING CLASSROOM PRACTICE

Robert J. Tierney and P. David Pearson
University of Illinois at Urbana-Champaign

August 1981

University of Illinois
at Urbana-Champaign
51 Gerty Drive
Champaign, Illinois 61820

Bolt Beranek and Newman Inc.
50 Moulton Street
Cambridge, Massachusetts 02238

The research reported herein was supported in part by the National Institute of Education under Contract No. HEW-NIE-C-400-76-0116.

A version of this paper appeared in E. K. Dishner, T. W. Bean, & J. E. Readence (Eds.), Reading in the Content Areas: Improving Classroom Instruction. Dubuque, Iowa: Kendall/Hunt, 1981, pp. 50-65.

CS806216

Learning to Learn from Text:
A Framework for Improving Classroom Practice

We believe that if teachers understand the nature of reading comprehension and learning from text, they will have the basis for evaluating and improving learning environments. In this regard, we find many advances in the psychology and pedagogy of reading comprehension that provide exciting possibilities for changing our approaches to helping students learn how to learn from text. For example, in terms of texts, we present evidence that suggests that less reliance should be placed upon traditional readability procedures involved in text selection and use, and that more credence should be given to teachers' impressionistic examinations of the extent to which a text fits with and might be used by selected students.

With respect to readers, teachers should recognize that a reader has a right to an interpretation and that reading comprehension is an interactive process involving more than a regurgitation of an author's explicit ideas. Readers should be encouraged to actively engage their background knowledge prior to, during, and after reading. They should be given opportunities to appreciate and evaluate the adequacy of their own perspective and other interpretations, to monitor their own progress through a text, and to discriminate new learnings from old knowledge.

Curriculum objectives might address: the importance, nature, and influence of a reader's background knowledge; the need for a variable

balance between reader-based and text-based processing; and the importance of selected monitoring strategies as well as transfer skills. Widely practiced notions that compartmentalize comprehension into simple question types on a continuum from literal to inferred to evaluative should be rethought. Teaching prescriptions for how to process a text that disregard the everchanging interplay of text, purpose, and reader should be discarded. In their stead, we advocate the adoption of teaching procedures that encourage students to monitor their own processing strategies--how they allocate attention to text versus prior knowledge, how they can tell what and that they know, and how to apply fixup strategies when comprehension is difficult.

In this paper, we will amplify each of the preceding notions about reading comprehension and classroom practice. First, we present some basic notions about reading comprehension. Thereupon, we discuss the implications of these notions for teaching. One should note that the suggestions for teaching are not intended to be exhaustive, exemplary, or very specific; instead, they are intended to provide teachers with guidelines and cursory examples of ways in which they might proceed to develop their own teaching procedures. We hope that the suggestions will be sufficiently explicit to guide adaptation and development.

Some Basic Notions about Reading Comprehension and Learning

Consider for a moment what is involved in comprehending the following passage:

The Dust Bowl

> During World War I, prices had tempted farmers to grow wheat and cotton in the former grazing lands of the Plains region. Plows and harrows broke up the deep, tough sod that had previously prevented erosion and conserved moisture in this semi-arid region. When the years 1933-1935 proved unusually dry, there was danger that the region would become a desert. Terrible dust storms carried away topsoil in such quantities that even on the Atlantic seaboard the sun was obscured by a yellow haze. The water table of parts of the Plains region sank so low that wells ran dry. Between 1934 and 1939 an estimated 350,000 farmers emigrated from the "dust bowl." To take care of immediate distress, Congress provided funds so that dust bowl farmers could get new seed and livestock. On a long-term basis, the Department of Agriculture dealt with the dust bowl by helping farmers to plant 190 million trees in shelter beds, which cut wind velocity and retained moisture. Farmers were also encouraged to restore the Plains to what they had been in the days of the cattle kingdom and earlier--a grazing region. (Bragdon & McCutchen, 1978, p. 623)

Readers familiar with farming and the Plains area of the United States will likely recognize how the drought, forces of supply and demand, and soil changes interacted to contribute to the deteriorating conditions of the Dust Bowl era. They might be able to visualize the changing conditions of the topography and sense the frustration and anguish experienced by the farmers. Readers unfamiliar with farming but possessing first-hand experience with economic hardship might focus on the personal hardships and family upheaval associated with periods

of depression. Readers who have experienced both farm life and economic hardship might even be able to go beyond visualizing the drought conditions to experiencing "a dryness of mouth" and "lump in their throats" as their interpretation of text triggers recall of specific experiences from the past.

The point of the example is that comprehension never occurs in a vacuum; it cannot proceed independently of a reader's fund of related experiences of background knowledge (or schemata--singular, schema--to use the recently rediscovered terminology of cognitive scientists). Comprehension is doomed to be at least somewhat idiosyncratic or at least conditioned by individual or group differences in background knowledge. And, in fact, there have been literally dozens of experimental demonstrations of the role that differences in background knowledge play in determining how students understand and retrieve information encountered in texts. Whereas this point may seem to belabor the obvious, current teaching and assessment procedures, with their emphasis on correct answers and preferred interpretations, seem to operate on the assumption that comprehension occurs independent of individual differences in background knowledge (a point to which we will return later in more detail).

How Does Comprehension Proceed?

If comprehension is not simply a matter of mapping the author's message into a reader's memory, how then does it occur? Let us begin with an example, taken from Collins, Brown, and Larkin (1977):

Window Text

> He plunked down $5.00 at the window. She tried to give him $2.50, but he refused to take it. So when they got inside, she bought him a large bag of popcorn. (p. 3)

With the initial statement, "He plunked down $5.00 at the window," the readers begin a search to build a model of the meaning of the text. One reader may invoke a racetrack scenario as a model; a second, a bank; a third, a movie theater. Each of these scenarios or models may be thought of as different schemata that different readers would invoke because of different levels of experience they have had with such scenarios in the past. Once invoked, each schema provides a framework for continuing the search to build a model for what the text means. For example, the racetrack schema creates expectations that bets, odds, horses, and jockeys will be mentioned soon, whereas the movie theater schema creates expectations for film title, certain types of food, like popcorn, and a stage with a screen.

Cognitive scientists like David Rumelhart (1977; 1980) say that schemata have certain slots that must be filled and that comprehension consists of recognizing specific items in a text that fill those slots. For example, "He" in the first sentence is a candidate for the "bettor" slot in a racetrack schema, the "depositor" slot in a bank schema, or the "movie-goer" slot in the movie theater scenario. As depicted in Figure 1, they may have constructed an initial model of the text involving, for example, a bank window, with some bound slots (concepts enclosed by boxes) and some slots awaiting binding (concepts enclosed by circles).

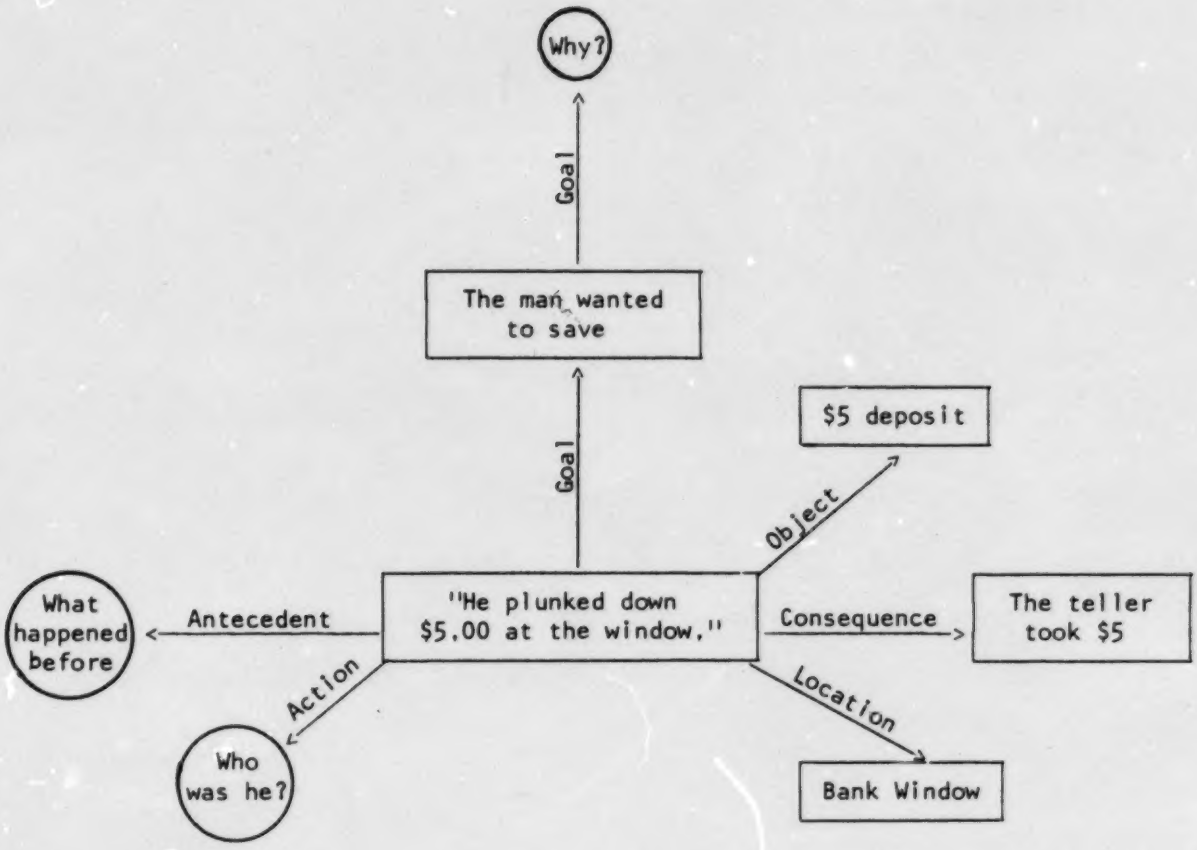

Figure 1. An initial stage in the construction of a model or scenario for the "Window Text."

As readers proceed, they progressively refine their models: "She" is usually defined as the recipient of the money; "$2.50" is usually identified as change. Then with the statement, "So when they got inside . . . popcorn," readers usually recognize a conflict. They realize their models no longer match the text and are implausible, disconnected, and incomplete. To restructure their model, they might question previous interpretations (for example, that the female was a bank clerk or a bet taker) and shift to a different schema--from a bank or racetrack to a theater. Eventually it is likely that a model will evolve for readers that involves the purchase of two tickets and an attempt by a date to share the expenses. At this point, readers will sense that they have accounted for the text and that their interpretations are plausible, connected, and complete--that is, their interpretations make sense, are coherent, and account for the text as well as their purposes for reading.

These same notions of reading comprehension can be applied to the passage "The Dust Bowl." With the initial statement, "During World War I, prices had tempted farmers to grow wheat and cotton in the former grazing lands of the Plains region," readers will likely activate their knowledge of farming and constrain these ideas in terms of the time period (World War I) and the type of farming to which the author alluded (wheat and cotton). As readers proceed, they are expected to relate these changes in farming--now focused on wheat and cotton--to plowing

and the effects of plowing upon the conservation of moisture and potential for soil erosion. Across the next several sentences, "When the years . . . terrible dust storms . . . well run dry," readers need to activate other background knowledge, maintain their focus, and progressively refine a model for the text. Assuming a singular purpose and adequate background knowledge, it is likely that readers will eventually develop a model for the text that involves an appreciation of the events causing the Dust Bowl crisis and what Congress did to alleviate the problem. Readers will then either tacitly or consciously consider the adequacy of their interpretation--in particular, the extent to which: (a) their purposes for reading the text have been met and accounted for in relation to the text; and sometimes (b) the relevance or transfer value of their acquired understanding.

A key point of schema theory, then, is that reading comprehension is akin to the progressive refinement of a scenario or model that a reader develops for a text. That is, reading comprehension proceeds and inferencing occurs via the refinement of the reader's model. As Collins, Brown, and Larkin (1977) described the refinement of the reader's model:

> The initial model is a partial model, constructed from schemas triggered by the beginning elements of the text. The models are progressively refined by trying to fill the unspecified slots in each model as it is constructed . . . and the search for relevant information is constrained more and more. (pp. 4-5)

Within this framework, reader's schemata drive text processing toward the refinement of a model or scenario that "matches" the text against the reader's world and that is complete, interconnected, and plausible. That is, the reader's schemata will be involved in construction of a scenario to account for the elements and relationships within the text and the world as the reader sees it. If the reader's model seems tenable, then those schemata that comprise the model will be involved in the further text processing. If the reader's model seems untenable, then schemata will drive the reexamination, reconstruction, or restructuring of elements in the text to build a new model.

To summarize, the following statements can be made about reading comprehension: (a) A reader's background knowledge, including purposes, has an overriding influence upon the reader's development of meaning, and (b) reading comprehension involves the activation, focusing, maintaining, and refining of ideas toward developing interpretations (models) that are plausible, interconnected, and complete. In addition, there is a sense in which the reader's comprehension involves two other facets: the reader's knowing (either tacitly or consciously) that his or her interpretations for a text are plausible, interconnected, and complete ("make sense"), and, ideally, the reader's evaluation of the transfer value of any acquired understandings.

Pedagogical Implications

Recent examinations of instructional practices suggest that there is not much in the way of worthwhile practices for developing or improving comprehension in schools (Durkin, 1978-79; Tierney, LaZansky, & Schallert, 1981). Instead, there is and has been a lot of comprehension testing and practice (students working by themselves on worksheets or answering questions) and a great deal of informal assessment (teachers quizzing students about text selections). In most lessons, students are given passages to read. During or after reading the passages, teachers ask questions (either orally or via a worksheet). Discussion of responses, if it takes place at all, focuses on finding a right answer. In terms of skill acquisition, a high premium has been placed upon separate objectives unrelated to any comprehensive model of reading comprehension or learning and clustered around curriculum objectives or arbitrarily defined skill categories (e.g., literal, inferential, and evaluative comprehension) that give little attention to the role of a reader's background knowledge and the importance of improving a reader's abilities to learn how to learn.[1] Reading comprehension is an area of the curriculum for which there has been little in the way of progress. Moreover, the changes that have occurred have not been tied to a careful analysis of the nature of reading comprehension and learning. We suggest that if teachers understand the nature of reading comprehension and learning, then they

have the basis for determining what might facilitate and what might impede the development of comprehension and learning. We believe that a schema-theoretic perspective offers such a basis. Accordingly, we suggest the following guidelines for implementing curriculum improvements. Our guidelines are tied to three traditional and interrelated segments in typical lessons for reading selections: preparing for reading, guiding reader-text interaction, and facilitating postreading comprehension and learning.

Prerequisite for Reading: Does the Reader Have Schemata Relevant for Understanding a Text?

Our first guideline addresses the empirically validated conclusion that a reader's prior knowledge has a pervasive influence upon understanding. Specifically, it is concerned with whether a match or mismatch exists between the purposes and prior knowledge of readers and the intentions and expectations of authors. That is, does the reader have the relevant schemata for a text?

Consider first the issue of match between an author's intentions and a reader's purposes. In our reviews of textbook materials, we have encountered numerous examples where text intended for one purpose is forced to fit other purposes. With little regard for the integrity of a selection, some publishers seem to presume that text well written for one purpose will be appropriate and well written for other purposes. For example, in a certain biology textbook, the publisher uses a text

describing the changing color of leaves to try to explain the physical process of these changes. The questions that are asked following the selection assume that the readers have been given many more details than the text provides; further, they totally disregard the descriptive-aesthetic functions that the text appears to serve. In the elementary classroom, simple narratives usually intended to be read for enjoyment are often sabotaged by an excessive use of poorly fitting questions (e.g., detail questions dealing with trivial information) under the guise of skill objectives.

What can teachers do? Prior to using text for pedagogical purposes, they can and should consider the functions that texts are intended to serve against the purposes for which a teacher intends and students will likely initiate. For example, text might be examined by first isolating the essential understandings that students are expected to derive from a text and then examining the extent and nature of support (usually in the form of concrete examples and analogies that can bind new learnings to old) for these understandings provided within the text. If the reader's purposes are quite unlike those intended by the author, and if the text cannot be augmented <u>even with teacher support</u> (i.e., the teacher provides the analogies and examples), then it should not be read to elicit those assumed understandings. Compare the obvious differences between the understandings that readers might be expected to glean from Stephen Crane's <u>The Red Badge of Courage</u> (1966), which uses the U.S. Civil War as background, and from a chapter on the Civil

War in a history textbook. In the former, it is the themes of death, fear, and cowardice evoked by the experiences of a young man participating in war that are likely to capture the reader. In the latter, it is the facts and concepts that describe and define the Civil War that will be paramount. For Crane's treatment, it might be reasonable to expect a reader to glean an appreciation of the mood of the experience of war; for the textbook chapter, it might be reasonable to expect the reader to develop an appreciation of the causes, progress, and consequences of the Civil War. Even with a great deal of teacher support (including additional information, clarification, and other material), neither text could serve the purposes for which the other text seems intended.

Consider second the issues of mismatch between an author's expectations regarding audience and a reader's prior background of experience. There are many times when a text written for an audience with certain background knowledge is given to an audience with different or limited knowledge of this same topic. For example, note the difficulties an American reader will incur when trying to understand the following passage, even if it were revised to a lower readability level.

Today's Cricket

> The batsmen were merciless against the bowlers. The bowlers placed their men in slips and covers. But to no avail. The batsmen hit one four after another along with an occasional six. Not once did a ball look like it would hit their stumps or be caught.

Revised Version

> The men were at bat against the bowlers. They did not show any pity. The bowlers placed their men in slips. They placed their men in covers. It did not help. The batsmen hit a lot of fours. They hit some sixes. No ball hit the stumps. No ball was caught.

Or consider the following segment taken from a biology text (Gallant, 1975):

The Garbage Collectors of the Sea

> The garbage collectors of the sea are the decomposers. Day and night, ocean plants and animals that die, and the body wastes of living animals, slowly drift down to the sea floor. There is a steady rain of such material that builds up on the sea bottom. This is especially true on the continental shelves, where life is rich. It is less true in the desert regions of the deep ocean.
>
> As on the land, different kinds of bacteria also live in the sea. They attack the remains of dead plant and animal tissue and break it down into nutrients. These nutrients are then taken up by plant and animal plankton alike. Among such nutrients are nitrate, phosphate, manganese, silica, and calcium. . . .

It does not take too much effort to identify the readers for whom these texts, even if adapted for readability, might be inappropriate or incomprehensible. The first passage is written for an audience knowledgeable about cricket; the second passage is intended for an American high school student with an understanding of decomposition, continental shelves, body wastes, and bacteria. We would predict that readers without these understandings will have a great deal of difficulty reading

the text and will likely develop incomplete or inappropriate interpretations for the text.

How can teachers assess whether a mismatch is likely to occur? It is our argument that traditional readability procedures (the use of formulas based upon word difficulty, word length, and sentence length, the use of the cloze procedure requiring the replacement of deleted words) will not suffice. Instead teachers should judge the adequacy of text for themselves. They should pursue an impressionistic evaluation of the demands of the text together with an assessment of readers' prior knowledge. For purposes of illustration, an analysis of the "Garbage Collectors of the Sea" could involve an examination of the support given the concept of decomposition and an informal assessment of what students know. For example, day and night and steady rain provide ample support for the notion that decomposition is a never-ending process; considered as vague might be the locational reference to continental shelf--a term likely to be unfamiliar to most readers--and those aspects of the text specifying what decomposers are. To verify the possibility of a mismatch, teachers might informally assess the students' background knowledge by discussing with students what they know about these key concepts prior to reading.

If mismatches are inevitable, teachers have the following choices: dismiss the passage as inadequate, or provide the students with the background experiences appropriate to the text. In terms of the latter,

teachers might provide adjuncts or supplemental experiences prior to having students read the text. For example, teachers might support the use of textbooks with other reading material, media, activities, and experiences to supplement what students already know. As Rumelhart and Ortony (1977) have emphasized, "In all cases existing knowledge is utilized and required for the acquisition of new knowledge" (p. 117), or as Pearson and Spiro (1981) suggest: "Instead of asking the question 'what does the student not know that I have to help him or her learn?', educators should be asking 'what is it that the student does know that I can use as an anchor point--a bridge--to help develop the concepts that he or she needs?" (p. 80). This implies that in those situations for which the reader lacks the background knowledge, teachers need to build bridges from what they already know or provide experiences or analogies (for example, a discussion of baseball as a means of understanding cricket) by which the reader can build such bridges for themselves.

Apart from specific action, teachers might offer a general program of schema development. Such a program might include field trips as well as films in conjunction with topics being read or discussed. It might involve students in activities that encourage their pursuit of or immersion in a topic through a variety of resources, for example, library materials and discussions with knowledgeable persons.

Guiding Reader-Text Interactions: Do Readers Engage Their Schemata?

Our second guideline moves our discussion of pedagogy from prerequisites for dealing with text to the issue of student engagement with text. In particular, our second guideline assumes that readers already have adequate prior knowledge for dealing with text and asks whether they engage it. Many theorists and practitioners advocate strategies that are derived either directly or indirectly from these notions. For example, most basal reading lessons and several reading educators advise teachers to begin with either selected questions or a discussion of a story topic designed to activate background knowledge prior to reading. During reading, they often insert questions as a means of guiding or shaping a reader's understanding. Stauffer's (1969) Directed Reading-Thinking Activity (DR-TA) is one such procedure where setting purposes together with guided reading are integral. As Stauffer has stated:

> . . . either the reader declares his own purposes or if he adopts the purposes of others, he makes certain how and why he is doing so. He also speculates about the nature and complexity of the answers he is seeking by using to the fullest his experience and knowledge relevant to the circumstances. Then he reads to test his purposes and his assumptions. As a result, he may: one, find the answer he is seeking literally and completely stated; two, find only partial answers or implied answers and face the need to either restate his purposes in light of the new information gained or to suspend judgment until more reading has been done; three, need to declare completely new purposes. (Stauffer, 1969, p. 40)

There are numerous other strategies and practices ranging from advance organizers to study guides to prefatory statements to questioning strategies directed at these same ends.

In general terms, schema engagement relates to: (a) the reader's initial contact with a text, (b) the reader's ability to relate his or her own background of experience to the information represented within the text, and (c) the reader's ability to focus and refine his or her understanding of the text material. In particular, the notion of schema engagement addresses the issues represented by the following questions:

> Was the reader's schema engaged prior to reading, during reading, and after reading?
>
> To what extent did learning occur? Was the reader's relevant background of experience focused and structured during reading?

For teachers, schema engagement can be a serious problem among some of their students. A teacher may assume correctly that students have appropriate schemata for reading a text, only to discover in a postreading discussion that they did not engage those schemata while reading. Sometimes this problem manifests itself as a general lack of interest for reading a text or as an unwillingness to consider a topic or purposes prior to reading. In this regard, sometimes a schema engagement problem may be passage-specific--that is, it may arise for certain texts and not others. Sometimes schema engagement problems occur because readers fail to maintain schemata while reading. This may occur for a number of different reasons. First, readers may be predisposed to plod

laboriously through any and every text they read. For example, readers may be devoting all their attention and capacity to decoding, leaving no room for comprehension. Second, poorly written text may make schema maintenance difficult if not impossible: for example, sudden shifts in topic, inadequate transitions, or poorly developed ideas may make the reader's task unduly difficult. Third, readers may be inattentive or distracted by too many or ill-considered adjuncts; that is, sometimes study questions and activities interrupt reading and cause a disruption of schema engagement.

What can teachers do? First and foremost, teachers should remain alert to whether students are engaging their schemata prior to, during, and after reading. Typically, a few well-placed and open-ended questions will elicit a response from students that will suffice for such an assessment. If schema engagement problems are apparent, then teachers can adopt and adapt teaching procedures to meet the specific needs of readers. Since it is unlikely that a single procedure will be appropriate for all students in all situations and it is possible that teacher adjuncts may "do more harm than good," the following broad suggestions are presented only for purposes of exemplification.

Source of Problem	Some Possible Solutions
General reader inertia lack of interest	Use highly motivational material and functional reading material that necessitates a student response (e.g., following directions to an experiment or treasure map).

Source of Problem	Some Possible Solutions
	Use adjuncts (inserted questions and study-guide-type activities) that relate what the student is reading to what they know and might do.
Passage-specific problems	Alert students to what readers do. Encourage the application of strategies across variant text situations (e.g., have students relate what they do in successful situations with what they do in unsuccessful situations).
Lack of focus and an inability to structure information	Have students develop "maps" or diagrammatic representations of the text.
	Provide adjuncts that encourage readers to focus and structure their ideas.
	Encourage students to use heuristics (who, what, when, where, why).
	Encourage notetaking and outlining.
Lack of focus due to laborious processing tendencies	Use texts that require or encourage greater student response.
	Encourage multiple passes through a text (skimming for the gist, rereading more carefully to check the relationship between key points, etc.).
	Highlight "reading for meaning."

Source of Problem	Some Possible Solutions
Text-based problems (discontinuity, poorly developed ideas, etc.)	Prepare adjuncts to circumvent the difficulties (e.g., include statements that clarify the ideas represented within the text or encourage students to skip over them if they are irrelevant. Encourage students to be the critics of poorly written text (e.g., have students evaluate poorly developed text and discuss how an author or reader might address these problems).
Overdependency upon teacher support	Avoid the use of any adjuncts that will displace the text. Use adjuncts sparingly and in conjunction with encouraging the reader to be self-initiating. Have students replace teacher adjuncts with their own probes. Discuss the purpose and role of any adjuncts.

Guiding Reader-Text Interactions: Does the Reader Exhibit Flexible Processing across Different Texts Read for Different Purposes?

Our third guideline is tied directly to our second guideline, but unlike our second it addresses the issue of monitoring reader-text interactions. As suggested earlier, when readers interact with text,

they will and should acquire some information that was represented in the text and integrate it with information from their background knowledge. Certainly, there are situations for which it may be reasonable to expect a reader's understanding to remain close to the text; for example, when following a set of directions; alternatively, there are other situations for which it may be appropriate to expect a more reader-based interpretation. With this in mind, consider those situations when readers' interactive processing reflects a tendency to be either "too text-based" or "too reader-based." For example, consider the situation where a reader's interpretation is too reader-based, producing understandings that are "too loose" for the text and its intended purpose. What might be the ramifications if a science student read the following text too loosely?

> The experiment that you are about to do deals with a property of light. For this experiment you'll need a penny, a cup, transparent tape, and a pitcher of water.
>
> To perform the experiment, tape the penny to the bottom of the cup. Move your head to a point just beyond where you can see the penny.
>
> Hold your head still, then slowly pour water into the cup. Be sure not to move your head.
>
> Stop pouring if the penny comes into view.

Here, to explain or perform the experiment adequately, the science student cannot take liberties lest he or she err in the performance of the experiment. Unfortunately, readers with tendencies toward

being too reader-based do not know that or what they do not know. They presume they know the material better than they actually do or need to. Particularly when the text deals with a familiar topic, readers assume that they know what is written. As a result, they often fail to recognize what might be subtle but important text signals. They fail to monitor their interactions with a text. In the context of many classrooms, these students escape identification, for they might be successful readers in most situations and, furthermore, can "bluff their way through" most teachers' questions.

What can a teacher do to help such students? First and foremost, teachers should alert students to the need to monitor their reading of texts differently for different texts. In text situations where a more text-based understanding is required, teachers might: alert the students to the need to read the material carefully; provide adjuncts (inserted questions or activities) that encourage students to monitor their developing interpretation; provide students with strategies such as outlining and notetaking for carefully reading the text; encourage students to consciously consider their purposes, their level of understanding, and ways to monitor that understanding; and have the students read the material in conjunction with carrying out some relevant activity (for example, an experiment in which successful performance is contingent upon a careful reading). Such students can be encouraged to consider the text more carefully by giving them questions that have

two or three correct distractor choices, some of which come from the text and some of which do not. Students then can be asked to discriminate between correct text-based and correct knowledge-based answers.

Alternatively, consider the situation where a reader's understanding is too "text-based" for the text and purposes for reading. As Spiro (1977) has suggested, certain conditions of schooling may predispose a reader to ascribe to text an autonomy that sponsors the separation of textual information from related prior knowledge. For example, a reader may minimize the interaction of his or her background of experience with a text to cope with the demands of answering a series of questions or the obvious demands of certain texts. Some may perceive the task of reading to be detached from self and tied to a text. In particular, they may perceive the task of reading to be detached from their own experiences. For example, in oral reading situations, in completing cloze activities (especially cloze activities demanding an exact-word replacement), and in response to a teacher's demand for a "more literal" interpretation, we would expect that students may misconstrue what reading comprehension is. They may decide, erroneously, that reading means a word-perfect rendition of a text.

What can teachers do in these situations? First, they should encourage readers to relate their background of experience to what they read and alert them to the importance of their own ideas, perspective, and purpose in any communication. Minimally, the reader

should be asked to discuss his or her knowledge, including a perspective about a topic in conjunction with a discussion of the author's perspective and what the author assumed the reader knew and might learn. Otherwise, the facilitation might be accomplished either through adjunct questions, activities, or appropriate variations. For example, sets of questions might be developed that encourage the reader to engage his or her own background of experience prior to, during, and after reading. Questions might encourage the reader to discuss his or her perceptions of what might happen and, at points during reading, what has occurred and any implications thereof.

To illustrate more specifically how this might proceed, here is a technique we have found useful. Begin by asking students what they think of when they hear the word X (where X is the topic that they are going to read about later). As they offer their associations, jot them down into categories (as yet unlabelled). For example, for tree the implicit categories might include parts of trees, kinds of trees, processes, products, and other tree-associated topics. Then go back and help the students to label the categories. Then ask them to read the chapter to learn more about X. After that, return to the set of categories related to X and ask students to add new terms that they have acquired from reading. What one ends up with is a vivid demonstration of the student's pre-existing schema, new learnings from the text, and the relationship between new and old information. The

technique also maximizes the likelihood of schema engagement during reading.

Postreading Comprehension and Learning: Is the Reader's Understanding Adequate? Are New Learnings Transferable?

Our fourth guideline moves us from guidance and monitoring of text interactions to addressing the adequacy of readers' understandings. Central to our discussion are two notions: first, the realization that what is considered accuracy of understanding should be regarded as relative; second, the issue of transfer of new learnings.

Consider the notion that accuracy of a reader's understanding should be regarded as relative. The key point here is that what is considered an appropriate understanding is likely to vary from reader to reader and from context to context. That is, accuracy of understanding is relative and should be considered a function of individual reader and individual text characteristics, as well as a function of purposes for reading. In constructing an interpretation, a reader selects, inserts, substitutes, deletes, and connects ideas in conjunction with what he or she perceives as "making sense." And what "makes sense" depends upon the text as well as the reader's purposes and background knowledge. There are two postulates taken from Tierney and Spiro (1979) that are relevant to this notion:

1. A reader's selections, insertions, substitutions, omissions, and binding of ideas are not necessarily a sign of reader error.

2. It should not be assumed that each text has a single interpretation.

What implications does this notion hold for teachers? It would seem that teachers need to respect both authorship and readership. Indeed, accuracy of understanding is misleading unless defined in terms of the author's intentions and the readers' purposes. This means that teachers must recognize the readers' right to interpret a text at the same time that they instill in students a responsibility to address the author's intentions in writing the text. Integral to curriculum objectives that capitalize upon this perspective is the inclusion of goals similar to the following: The student is able to make judgments about his or her own understanding, the author's intentions, task demands, and strategy utilization. This will include objectives directed at having the student recognize alternative perspectives, the engagement of their own background knowledge, the plausibility of alternative interpretations, the viability of strategies for learning from various texts for alternative purposes, the nature of task demands (including author's intention and plan of organization), and nature and applications of new learnings. Integral to classroom practices, we suggest that teachers should assess the quality of a reader's interpretation in accordance with the following:

To what extent was the reader's understanding adequate for the text and purposes for reading?

When a reader's understanding diverges from some consensual author's intention, can the reader's interpretation be justified? Current practices, with their emphases upon correct answers and a single appropriate interpretation, violate these principles. In their stead, we suggest that teachers need to move away from assessment procedures that sponsor a "single-correct-answer mentality" and generate devices that are open-ended and that allow for divergent responses. For example, after reading a selection, teachers might allow students to relate their own interpretations prior to prodding them with an array of questions. To move students away from "the right answer" orientation, students might be asked to rate or rank the plausibility of each response to a multiple choice question. In follow-up discussions different students can compare the rationales behind their various rankings or ratings. The acid test for student response quality should be "can it be justified?" rather than "is it right?" This criterion places the emphasis precisely where it should be placed: on the quality of students' reasoning abilities. Such a stance will also increase the likelihood that important rather than trivial aspects of text will receive emphasis.

Consider next the notion of transfer. The notion of transfer relates to whether a reader can apply what he or she has read or learned to other situations. At issue in any teaching reading comprehension situation should be two key considerations.

Is the reader able to recognize new learnings and potential application?

Is the reader able to apply skills acquired during instruction to other text situations without the support of such instruction?

These two questions can be translated into simple tests of comprehension: (a) Can readers use the new knowledge they have acquired? And (b) can readers use the new strategies they have acquired when they encounter new texts on their own?

The issue of applying or using new knowledge places reading in a real-world context. The criterion assumes that students understand, remember, and evaluate new information more readily when they know its relevance to other experiences. That is, students should be asked to consider "the point" of what they have read, whether that point be for enjoyment, information gain, or to solve problems.

The second issue--applying learned strategies--gets at the heart of instruction. Presumably we teach so that students will become independent learners, no longer needing our intervention and support. Independence is the essence of transfer. Unfortunately, very few studies have addressed the transfer-of-strategy issue. From those few studies that have been reported, we are impressed that students rarely develop an ability to transfer or apply knowledge, skills, or strategies spontaneously--that is, when they are left to their own resources. Instead, they need to be guided toward transfer. This includes being alerted to when and how to use what strategies.

By implication if teachers are to help students develop independent reading and learning skills, they should not assume that it will just happen. Situations and activities need to be implemented wherein students can try, discuss, and evaluate their strategy, skill, and knowledge utilization across a variety of reading situations. In this regard, teachers need to move beyond merely mentioning reading comprehension skills and begin helping students learn how to learn. There appear to be some general guidelines emerging from recent research on teaching reading comprehension that are relevant to this goal. One rather consistent finding is that students rarely acquire transferable abilities without being provided ample opportunities to develop and practice those abilities in a variety of relevant contexts. A key word here is relevant. Relevance pertains to the notion that students need to understand the purpose and function of reading strategies, comprehension, or learning, as well as be given appropriate situations within which to explore their nature. If a reader is being asked to apply a strategy determining the main idea, the reader should do so within a variety of situations for which it is reasonable to find the main idea. Furthermore, readers appear to profit most from such learning experiences when they are given an explicit understanding of when, why, how, and what to do.

Concluding Remarks

It has been the purpose of this paper to draw upon recent developments in the study of reading comprehension as a means of examining

issues or relevance to improving reading comprehension and learning from text. We have suggested that if teachers are to develop a reader's understanding, they should address the adequacy of their pedagogy against some basic notions about reading and learning. The notions that we have suggested are driven by a schema-theoretic perspective--a view that prompted the following questions as guidelines to instructional decision making.

- Does the reader have the relevant schemata for a text?
- Was the reader's schema activated (purpose, background knowledge, attention, focus, interest) prior to, during, and after reading? Was the reader's relevant background of experience activated during reading?
- Across reading materials for different purposes, did the reader exhibit flexible processes in terms of activating, focusing, maintaining, and refining an interpretation? Was the reader aware of the strategies one could use to cope with different texts and purposes for reading?
- To what extent was the reader's understanding adequate for the text and purposes for reading? When a reader's understanding diverges from some consensual author's intention, did the reader justify his or her idiosyncratic interpretation? Did the reader recognize his or her perspective and the perspective of others?
- Was the reader aware of his or her level of understanding of a text read for different purposes?
- Did the reader recognize new learnings and their potential applications?

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Footnote

[1]Implicit within our discussion of the nature of comprehension has been the suggestion that inference and interpretation are as essential to acquiring an understanding as they may be to extending understanding after reading. This idea suggests that the widely espoused notion of a continuum from literal to inferred to evaluative has questionable validity. Not only does it lack validity as a statement about reading comprehension, it may have questionable utility as a curriculum guideline. There are many ways to acquire an understanding and at times different permissible understandings, regardless of whether these understandings be literal, inferential, or evaluative. Our point is that unless a great deal of thought goes into operationalizing curriculum procedures based upon these categories, teachers may find that they are forcing a student to deal with the literal when it would be more appropriate to address the inferred or evaluative. We believe that every act of reading necessitates inferential and interpretive understandings. In fact, students may need to deal with the inferential and evaluative prior to addressing the "literal."

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